IN THE DRAWINGS

Marked-up versions of FIGs. 1, 2, 4, 8a, 8b, 9a, 9c, 11a – 11c, 12a, 12b, and 15c showing changes in red, follow this page; replacement sheets are positioned at the end of this amendment and response.

REMARKS

Applicants have considered the office action mailed January 24, 2006 in connection with the above-identified patent application.

Applicants reiterate their request, expressed in the Amendment and Response filed November 10, 2005, and again ask that the Office records be updated with the current attorney docket number (19662-026001) for the subject application.

Statement of Substance of Interview

Applicants' representative, the undersigned, thanks Examiner Sines and Supervisory Examiner Gakh for courtesies extended during an in-person interview at the U.S. Patent and Trademark Office on March 28, 2006. Also in attendance were Applicants' representative, Mary Ann Dillahunty, and Kalyan Handique, Ph.D., Chief Technical Officer of HandyLab, Inc. (the assignee of the instant application).

During that interview, the patentability of the then-pending claims over the cited references was discussed. No agreement was reached however regarding the patentability of the then-pending claims. Applicants undertook to consider further claim amendments in conjunction with filing a RCE.

Amendments to Specification and Drawings

With the instant amendment and response, Applicants amend the specification and drawings to correct various typographical errors and other various clerical errors, the nature of which would be clear to one of ordinary skill in the art and which are, as follows.

FIG. 1 is amended to delete reference numeral 134. Applicants respectfully point out that, as would be clear from the accompanying portion of the specification, the correct reference numeral 134 refers to a different element, as shown in FIG. 2.

FIGs. 2, 4, 8a, and 9a are amended to insert references to corresponding figures wherein arrows are shown to indicate a cross sectional view.

FIG. 4 has been amended to insert (or correct position of) various reference numerals, including 156, 410, 420, 901, 915, 950, 972, 973, 979, and 981. The positioning of such new or revised reference numerals is based on other drawings as filed and the accompanying description found in the specification as filed.

FIGs. 8a and 8b have been amended to insert reference numeral 820, as found in the accompanying description in the specification as filed.

FIGs. 9a and 9b have been amended to insert reference numeral 822, as found in the accompanying description in the specification as filed.

FIGs. 11a – 11c have been amended to insert reference numeral 526, and FIG. 11b has been amended to insert reference numeral 504, as found in the accompanying description in the specification as filed.

FIGs. 12a and 12b have been amended to insert various reference numerals, including 200, 206, 212, 214, 915, and 950. The positioning of such reference numerals is based on other drawings as filed and the accompanying description found in the specification as filed.

FIG. 15c has been amended to insert various reference numerals, including 654, 656, 658, 660, and 682. The positioning of such reference numerals is based on other drawings as filed (in particular FIGs. 15a and 15b) and the accompanying description found in the specification as filed.

All of the amendments to the figures are therefore merely for completeness and consistency, and no new matter is introduced thereby.

In respect of the amendments to the specification, paragraphs on pages 6, 7, 10, 13, 14, 19, 20, 21, 22 and 24 have been amended to correct various errors of spelling, grammar, or in reference to Figure numbers.

Paragraphs at pages 8, 9, 13, 16, 20, 21, and 23 have been amended to correct terminology and reference numerals in the figures where inconsistent with other usage within the specification as filed and where it would be clear which element is correct, or to insert description of reference numerals from the figures where such description would be clear to one of ordinary skill in the art.

Additionally, the filing date in the reference to application serial no. 09/953,921 in the paragraph at page 9, line 6, has been corrected.

Regarding the paragraph beginning at page 21, line 14, Applicants have also expanded the acronym "TRS" to "thermally responsive substance". This expansion can be found throughout U.S. patent application serial no. 09/953,921 (now U.S. Patent No. 6,575,188) — for example in the Abstract, Summary of Invention, and claims — to which the instant application claims priority. Since the specification of application serial no.

09/953,921 is incorporated by reference into the specification of the instant application, this amendment introduces no new matter.

Accordingly, none of the foregoing amendments to the specification and claims introduces new matter, and entry thereof is respectfully requested.

Amendments to the Claims, and New Claims

Prior to entry of the instant amendment, claims 1-3, 5-12, 14-21, 23-28, and 30-33 are pending in the instant Application, and claims 34-37 are withdrawn from consideration.

With the instant amendment, Applicants amend claims 1, 3, 6 – 9, 11, 14 – 16, 18 – 21, 23 – 26, and 30-33, and cancel claims 2, 5, 10, 17, 27, 28, and 34 – 37. New claims 38 – 56, are also introduced herein.

Support for the new and amended claims contained herein are found in the specification as filed, as follows.

Claims 1 and 6, as amended herein, are supported by, for example, FIG. 5, and accompanying text of the specification at, for example, page 8, line 30 to page 10, line 20. The recitation of a processing module finds support in the specification at least at page 12, lines 19 – 21. Additionally, the limitation pertaining to a first valve, introduced into claim 1 herein, was formerly present in claim 5, now cancelled herein.

In claims 1, 8, 19, 24, the term "enrichment zone" is changed to "enrichment module" (see, *e.g.*, specification as filed at page 8, lines 6 – 7).

In claims 7, 9, the term "enrichment zone" is changed to "enrichment chamber" (see, *e.g.*, specification as filed at page 9, line 20).

In claims 7, 8, and 12, "downstream region" is changed to "downstream channel" (see, *e.g.*, specification as filed at page 10, line 28).

Claim 8 is also amended to recite a lower and upper substrate, as found in the specification as filed at, *e.g.*, FIG. 2, and specification at page 6, lines 19 – 21.

Claim 9 is amended to recite an operation of an actuator, as described in the specification as filed, at, *e.g.*, page 11, lines 13 – 25.

Claim 12 is amended to recite "only a portion" of the enriched particle sample, as found in the specification at page 13, line 30.

In claims 14, 15, 30, and 31, the term "lysing zone" is changed to "lysing module", as found at least at page 14, line 14 of the specification as filed.

Claim 18 is amended to recite a "sample input module" and a "sample introduction channel", terms which find support in the specification as filed at, respectively, *e.g.*, in FIG. 3 and page 7, line 31, and in FIG. 5 and page 9, line 7.

Claims 19 and 23, as amended herein, are supported by, for example, FIG. 5, and accompanying text of the specification at, for example, page 8, line 30 to page 10, line 20. The recitation of a processing module finds support in the specification at least at page 12, lines 19 – 21.

Amendments to claim 24 are found in the specification as filed, *e.g.*, at page 11, lines 13 – 25.

In claims 32 and 33, the term "polymerase chain reaction zone" is changed to "DNA manipulation module" (see, *e.g.*, specification as filed at page 19, lines 1 – 19).

Additionally, claims 3, 7, 9, 20, 21, and 24, are rewritten from active to passive language.

Furthermore, claims 11, 14, 16, 20, 21, 25, 26, 30, and 31 are rewritten to more particularly recite what is considered to be the invention, and the dependencies of claims 3, 6, 8, 9, 14, 15, 16, 21, and 25, are also amended to ensure consistency with the other amendments described herein.

Finally, support for new claims 38 – 56, is as follows:

Claim 38, at least in FIG. 5, and page 9, line 18 to page 10, line 16.

Claim 39, at least at pages 6 – 7.

Claim 40: for example, at page 3, lines 1 – 2.

Claim 41: at least in claims 8, 10, and 25 as originally filed.

Claims 42 and 43: at, for example, page 7, lines 15 – 26, and in FIG. 2.

Claims 44, 46, 54, and 56: at least at page 21, lines 20 – 21.

Claims 45 and 55: at, for example, page 9, lines 12 – 13.

Claims 47 – 49, and 52: at least at page 9, line 18, to line 26.

Claims 50 and 51: at least at page 11, lines 8 – 11.

Accordingly, the new claims presented herein are supported by the specification as filed, and thereby introduce no new matter. Entry thereof is respectfully requested.

Elections/Restrictions

The Examiner has requested cancellation of claims 34-37, which are withdrawn from prosecution as drawn to a non-elected invention. With the instant amendment, Applicants herewith cancel claims 34 – 37 without prejudice. Applicants reserve the right to prosecute the subject matter of claims 34 –37 in one or more continuation or divisional applications.

REJECTIONS OF THE CLAIMS

The Examiner has rejected claims 1-3, 5-8, 14-21, 23-28, and 30-33, under 35 U.S.C. § 103(a) as allegedly being obvious over U.S. Patent Application Publication No. 2002/0055167 to Pourahmadi, ("Pourahmadi", hereinafter), in view of U.S. Patent No. 6,130,098 to Handique ("Handique" hereinafter). After entry of the instant amendments, claims 2, 6, 10, 17, 27, 28 are cancelled. Accordingly, the claims which stand rejected are claims 1, 3, 6 – 8, 14 – 16, 18 – 21, 23 – 26, 28, and 30 – 33.

The U.S. Patent and Trademark Office ("PTO") bears the burden of establishing a *prima facie* case of obviousness. *In re Bell*, 26 USPQ2d 1529 (Fed. Cir. 1993). To establish a *prima facie* case, the PTO must satisfy three basic criteria, one of which is that the prior art reference, or references when combined, must teach or suggest each and every limitation of the claimed invention. *In re Royka*, 490 F.2d 981, 180 USPQ 580 (CCPA 1974).

Applicants respectfully submit that the Examiner has not satisfied the Office's burden of establishing a *prima facie* case, at least because the combination of cited references fails to teach or disclose Applicants' claimed invention.

In essence, the Examiner has alleged that one of ordinary skill in the art would have had a reasonable expectation that the actuator taught by Handique could be successfully combined with a microfluidic cartridge of Pourahmadi. Applicants respectfully submit that this rejection is rendered moot by the claim amendments presented herein. Specifically, the structures recited in the instant claims cannot be found in the cited references, either alone or in combination.

Claims 1, 3, 7, 8, 14 – 16, 18 – 21, 24 – 26, 28, and 30 – 33

Applicants' instant claims 1 and 19, as amended herein, recite a microfluidic device comprising an enrichment module, a downstream channel leading to a processing module, an actuator, and first and second valves. Specifically, the disposition of the actuator and the first

valve is such that, in Applicants' claimed invention, the first valve is disposed between the actuator and the flow-through member. Furthermore, the microfluidic device of Applicants' claims, as amended herein, is configured to manipulate microdroplets of fluid.

Pourahmadi teaches a continuous-flow microfluidic cartridge having a collection of components. Although Pourahmadi refers generally to the use of "fluid motive sources" to move fluid through the cartridge (Pourahmadi, at paragraphs **[0065]** to **[0067]**), none of these sources is shown in any specific configuration. In particular, Pourahmadi provides no specific teaching of a location of a fluid motive source, such as a "pneumatic pressure source," when "located inside the cartridge," but instead merely states that, when *outside*, "the cartridge has suitable ports, vents, or channels for interfacing with the source" (Pourahmadi, at paragraph **[0067]**). This disclosure is not specific enough to lead one of ordinary skill in the art to Applicants' claimed configuration, either alone or in combination with Handique, as further discussed hereinbelow.

Furthermore, although, as pointed out by the Examiner, Pourahmadi references "flow controllers ... *e.g.*, valves" (Pourahmadi at paragraph **[0052]**), none of the flow controllers disclosed is in a position comparable to those recited in Applicants amended claims, at least because without a specific teaching of an actuator in Pourahmadi the flow controllers cannot be shown in relation to the actuator. Thus, flow controllers 123 in FIG. 2 are placed generally "for controlling the flow of fluid through the cartridge" (Pourahmadi, ¶ **[0056]**), but since a position of an actuator is not specified, none of these corresponds to the position in Applicants' claims. In summary, none of the disclosures in Pourahmadi teaches the disposition of valves in conjunction with an actuator, as recited in Applicants' claimed invention.

The teachings missing from Pourahmadi are not provided by Handique. In particular, elements 70 and 170 of FIGs. 3A, 3B, 4A, and 4B as referenced by the Examiner are not valves, but vents. This is seen from the accompanying description, at, *e.g.*, Col. 14, lines 45 – 57 of Handique. Furthermore, the structures shown in FIGs. 3A, 3B, 4A, and 4B, are for creating microdroplets (Handique, section running from Col. 13, line 60, to col. 15, line 40), using a "system that *does not* require the use of valves" (Handique, col. 13, line 66). Thus, although an actuator is shown in FIGs. 3A, 3B, 4A, and 4B, it is not shown in conjunction with valves, as required by the instant claims.

The portion of Handique (col. 16, lines 40 – 61) that references "Flow Control with Sealed Valves" is a generic description alone, and references no specific structure in which valves are used. Accordingly, this disclosure in Handique is not specific enough to teach Applicants' claimed invention.

Accordingly, neither Pourahmadi nor Handique, alone or in combination teaches or discloses a microfluidic device having an actuator and a valve disposed in the configuration recited in claims 1 and 19. Therefore, for at least the foregoing reasons, Applicants' claims are not obvious over the combination of Pourahmadi and Handique because that combination does not teach or disclose every element of the claims.

Finally, should the Examiner disagree with this assessment of Pourahmadi, he is reminded that Pourahmadi discloses a continuous-flow type microfluidic device (see, *e.g.*, Pourahmadi at ¶ **[0017]**), and not one that manipulates microdroplets as required by the instant claims. By contrast, Handique does disclose a microfluidic device for manipulating microdroplets. Accordingly, one of ordinary skill in the art would not have been motivated to combine the teachings of Pourahmadi and Handique.

Dependent claims are nonobvious under 35 U.S.C. § 103 "if the independent claims from which they depend are nonobvious." *In re Fine* 837 F.2d 1071; 5 USPQ.2d 1596; MPEP 2143.03. Claims 3, 7, 8, 14 – 16, 18, and new claims 38 – 51 depend directly or indirectly from claim 1, and claims 20, 21, 24 – 26, 28, 30 – 33, and new claims 52 – 56 depend directly or indirectly from claim 19. Therefore, none of these claims is obvious over Pourahmadi in combination with Handique.

Claims 9 – 12

Applicants note that the subject matter of claims 9 – 12 has not been addressed by the Examiner in light of either Pourahmadi, Handique, or a combination thereof. Applicants reiterate their request, articulated in the response filed November 10, 2005, for the Examiner to clarify the disposition of these claims. Applicants also respectfully submit that the arguments rebutting the allegation of obviousness of all other pending claims, as presented hereinabove, have equal force as regards claims 9 – 12, were the Examiner to allege that such claims are obvious on similar grounds.

Accordingly and in conclusion, Applicants respectfully submit that all of the pending claims, whether rejected under 35 U.S.C. § 103 or not, are non-obvious in view of a combination of Pourahmadi and Handique, and ask that the rejection of record be removed.

CONCLUSION

In view of the above remarks, Applicants respectfully submit that the subject application is in good and proper order for allowance. Withdrawal of the Examiner's rejections and early notification to this effect are earnestly solicited. If, in the opinion of the Examiner, a telephone conference would expedite the prosecution of the subject application, the Examiner is encouraged to call the undersigned at (650) 839-5070.

No fee is believed owed in connection with filing of this amendment and response. However, should the Commissioner determine otherwise, the Commissioner is authorized to charge any underpayment or credit any overpayment to Fish & Richardson P.C. Deposit Account No. 06-1050 (ref. No. 19662-026001) for the appropriate amount. A copy of this sheet is attached.

Respectfully submitted,

Date: June 26, 2006

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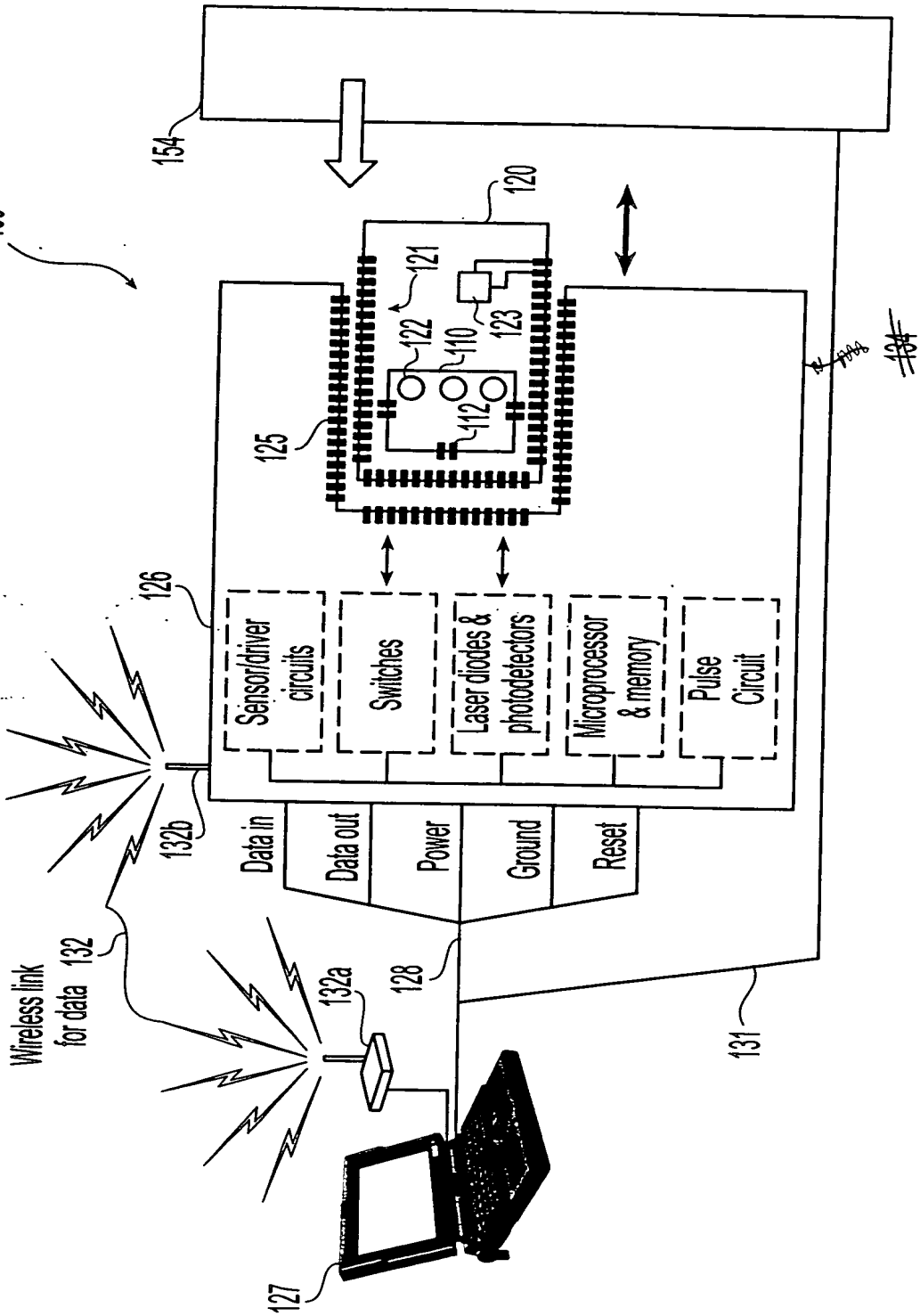

Fig. 1

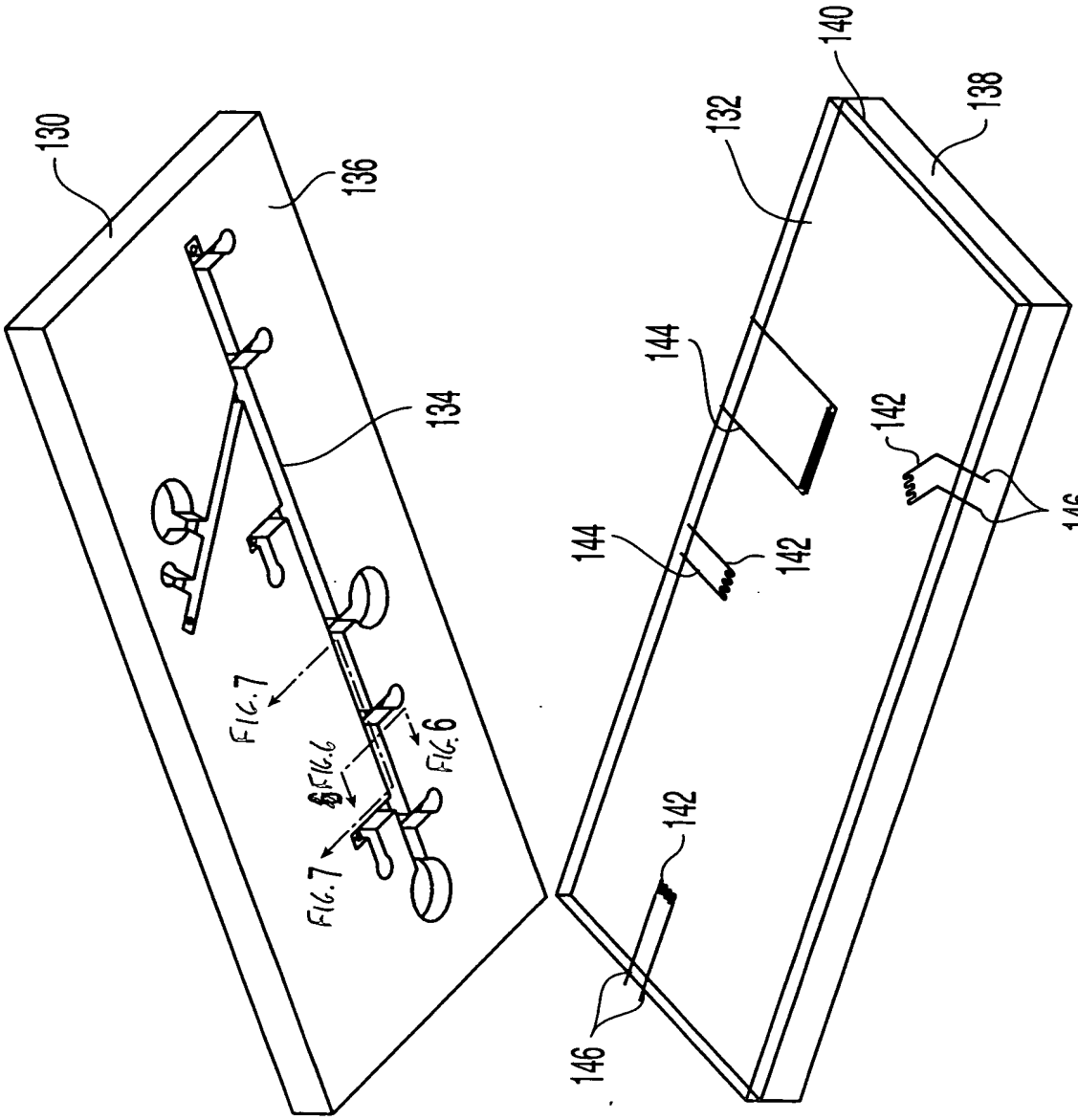

Fig. 2

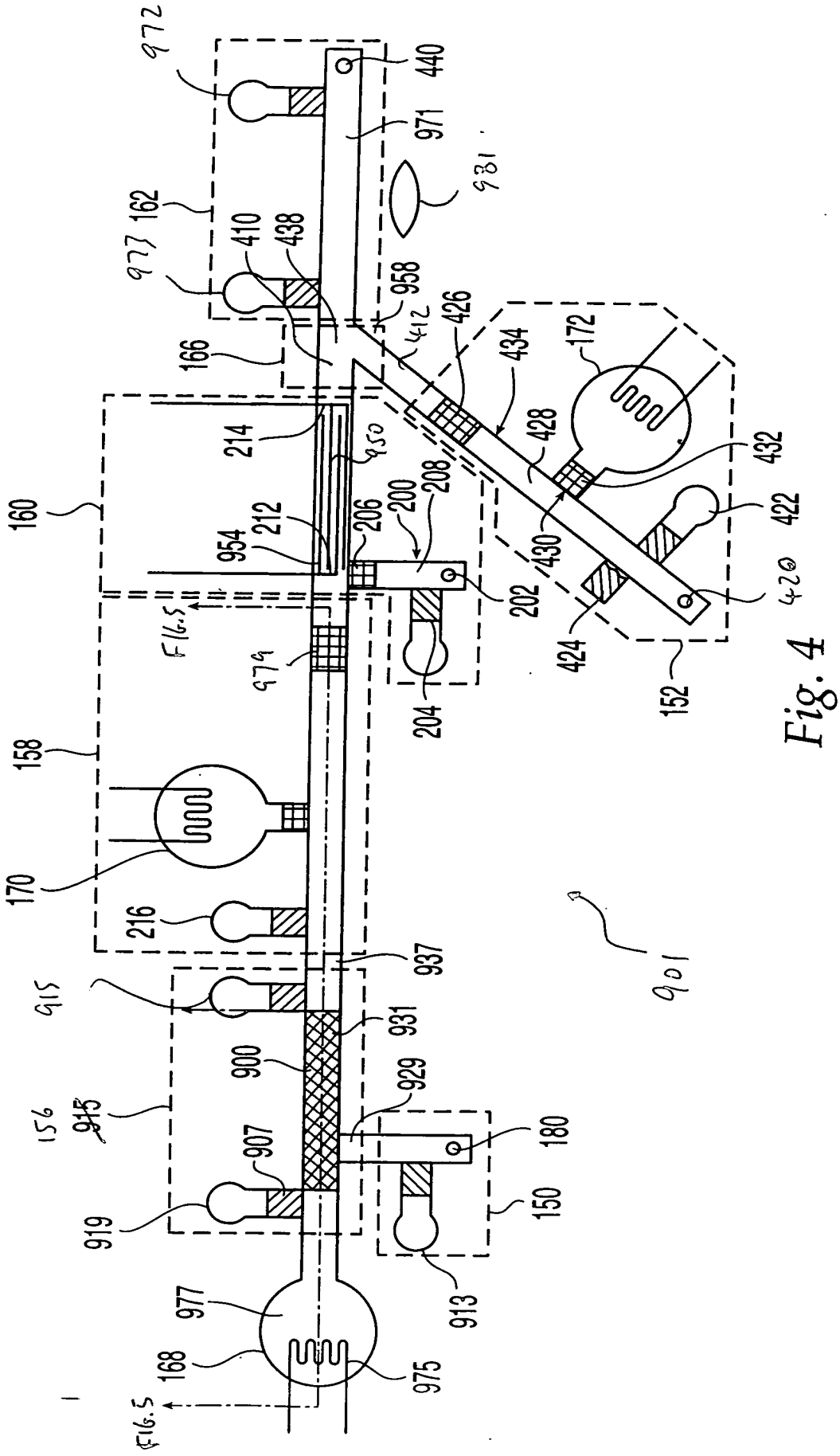

Fig. 4

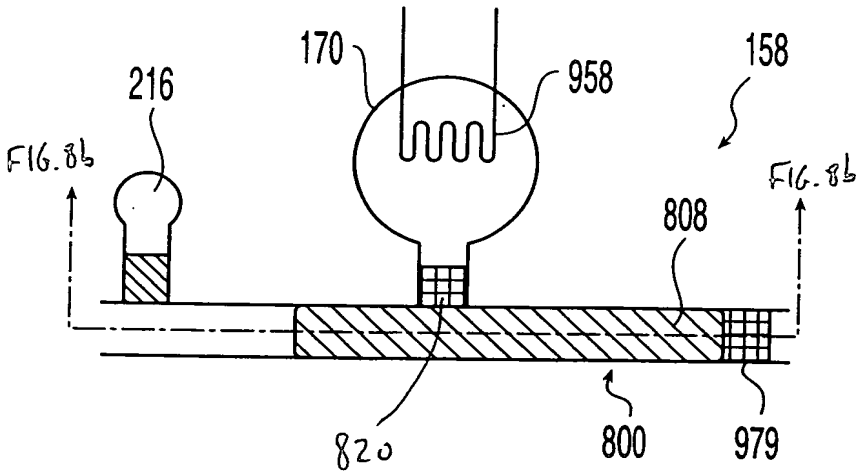

Fig. 8a

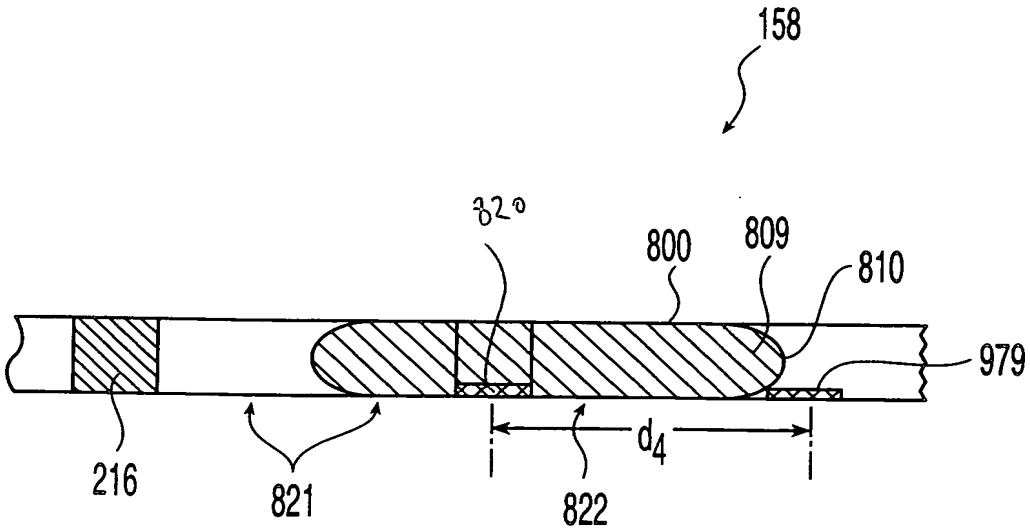

Fig. 8b

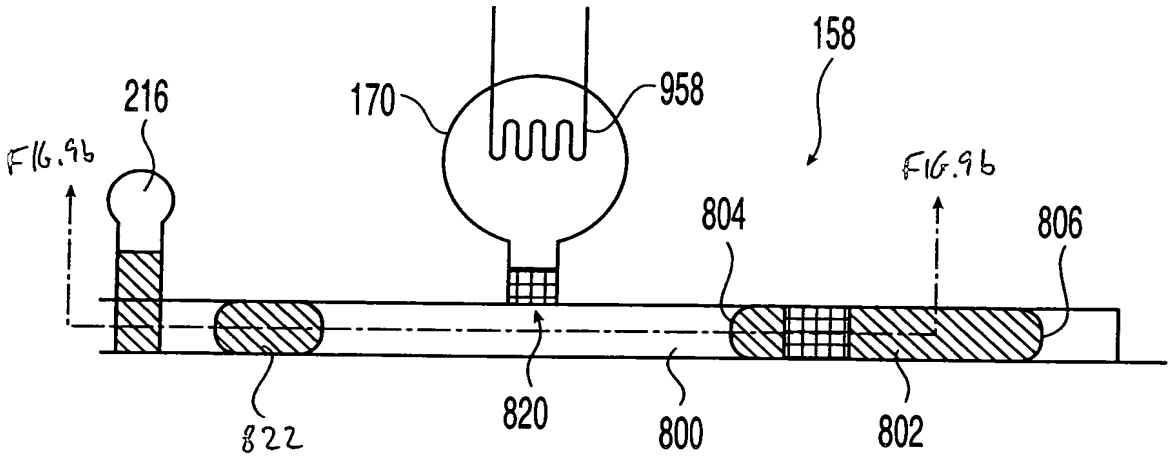

Fig. 9a

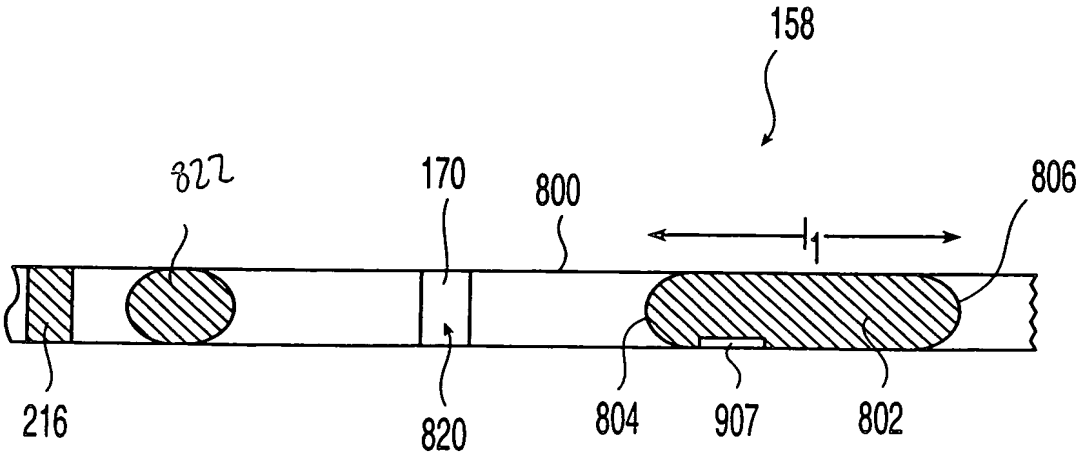

Fig. 9b

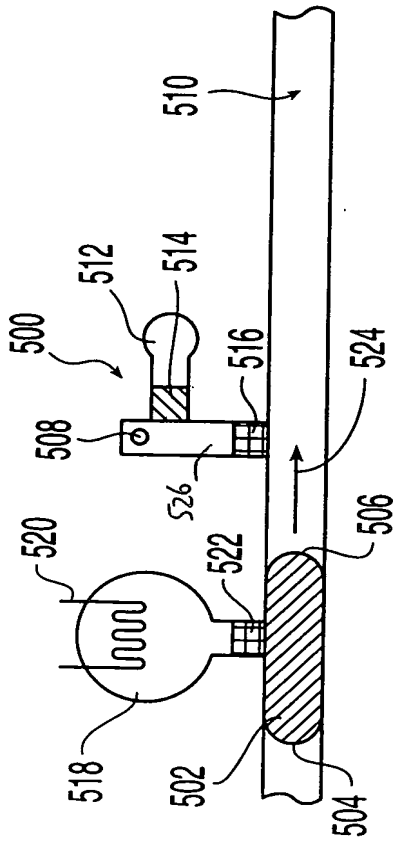

Fig. 11a

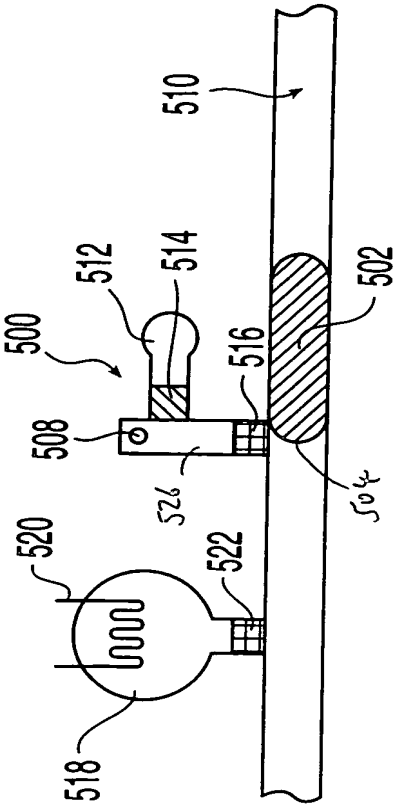

Fig. 11b

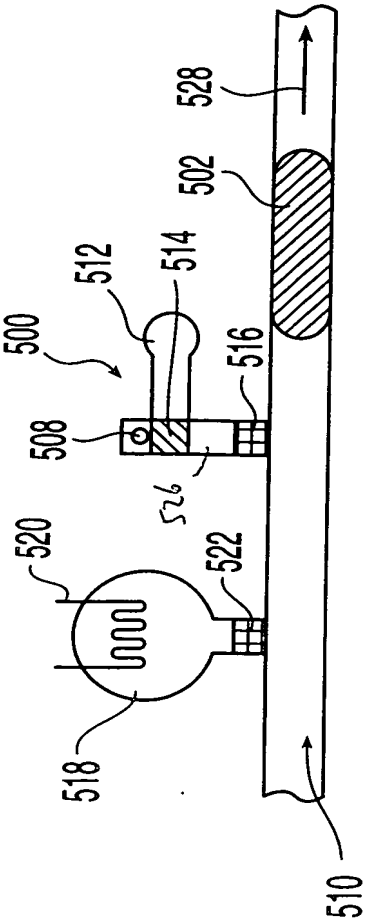

Fig. 11c

Fig. 12a

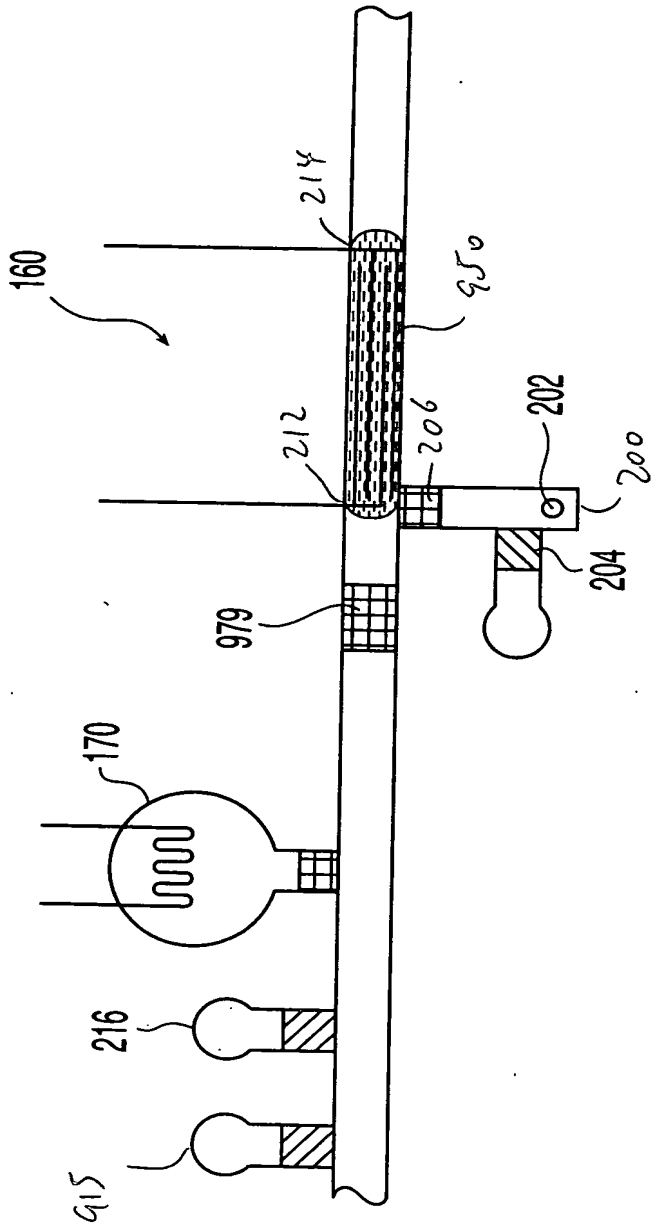

Fig. 12b

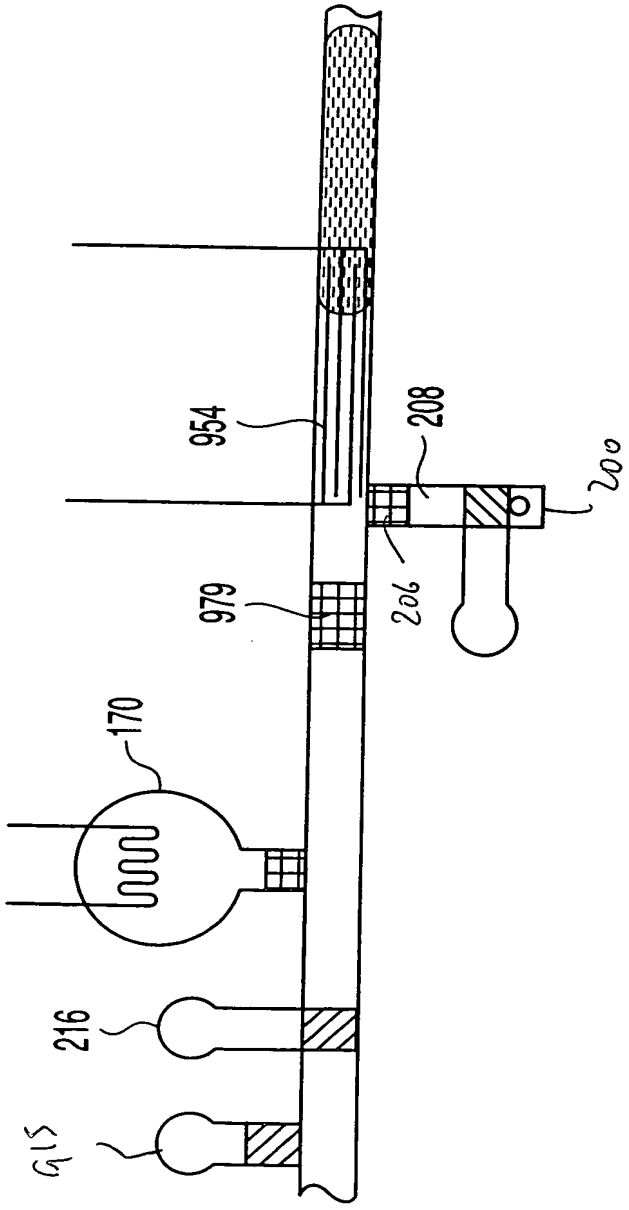

Fig. 15c